

Commentary on four recently published papers on chronic pain and spinal surgery

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Abstract

This commentary evaluates four articles dealing with chronic pain from very different perspectives. The first paper by Tsantoulas and McMahon entitled “Opening paths to novel analgesics: the role of potassium channels in chronic pain” evaluates the membrane neurochemistry of the neural cells governing the transmission of pain impulses in the spinal cord and trigeminal systems. As potassium membrane potentials diminish excitability in the nociceptive pain pathways, damage to these pathways may result in excessive transmission of impulses that contribute to “chronic pain”. Haneder et al. analyzed degeneration in lumbar discs utilizing ^{23}Na magnetic resonance (MR) imaging to determine whether this would help analyze low back pain versus standard 1H MR imaging. As degenerated discs lose glycosaminoglycan, which attracts ^{23}Na , this imaging could potentially be useful in detecting degenerating intervertebral discs. Mroz et al. analyzed how 445 spinal surgeons handled recurrent lumbar discs (first and second recurrences) herniations in the United States. Surgeons in practice for more than 15 years were more likely to select simple disc revision, while those with fewer years experience and performing more than 200 cases per year were more likely to select revision surgery that included some form of inter-body fusion. Lee et al. performed a multivariate analysis of more than 1532 patients to validate a predictive model of the risk of surgical site infection after various spine surgeries. Outcomes analyzed the frequency of reoperations for irrigation/debridement, and evaluated how patients’ comorbidities helped predict the risk of infection (e.g. obesity, rheumatoid arthritis, and the number of levels/extent of surgery).

Key Words: Chronic pain, degenerated discs, potassium channels, recurrent discs, spine surgery, surgical site infection, ^{23}Na MR imaging

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COMMENTARY ON “OPENING PATHS TO NOVEL ANALGESICS: THE ROLE OF POTASSIUM CHANNELS IN CHRONIC PAIN” BY TSANTOULAS AND MCMAHON

The first and perhaps the most exciting paper from an experimental standpoint was the manuscript by Tsantoulas and McMahon on potassium channels in

chronic pain.^[4] It was, however, the hardest to read for the average clinician, unless she/he is well versed in the membrane neurochemistry of the cells in the neuraxis (e.g. specifically those governing the transmission of pain impulses in the spinal cord and trigeminal systems). One of the actions of potassium membrane potentials is to diminish excitability in the nociceptive pathways. Damage to these pathways (e.g. lack of function) result in excessive

transmission of impulses, which appears to contribute to/be responsible for the “chronic pain”. The authors extensively discuss the function of these channels, and note that few have investigated the role potassium channels play in the generation of “chronic pain”. Such future investigations may eventually lead to novel chemical treatments for treating or obliterating such chronic pain syndromes. Future investigations may explain how modulating the potassium channel system would impact chronic pain patients’ subjective complaints/behaviors, somatization, anger, depression, and secondary gain. The authors conclude: “The exceptional abundance and breadth of function encountered in K⁺ channels has complicated efforts to untangle explicit roles in pain syndromes”.

COMMENTARY ON ²³Na-MR OF THE HUMAN LUMBAR VERTEBRAL DISCS: IN-VIVO MEASUREMENTS AT 3.0T IN HEALTHY VOLUNTEERS AND PATIENTS WITH LOW BACK PAIN BY HANEDER ET AL.

Haneder *et al.* analyzed degeneration in lumbar discs utilizing ²³Na MR imaging to determine whether this study provided additional useful clinical information in the analysis of low back pain versus standard 1H MR imaging.^[1] This relatively small retrospective study (e.g. other prior studies were larger) compared 55 healthy volunteers to 11 with a history of low back pain. Degenerated discs lose glycosaminoglycan, which attracts ²³Na; that loss is detected on ²³Na MR imaging. The authors concluded that utilizing such imaging was potentially useful in detecting degenerating intervertebral discs (e.g. using the Pfirrmann classification), but that larger studies with feasible field strengths are necessary.

III. COMMENTARY ON DIFFERENCES IN THE SURGICAL TREATMENT OF RECURRENT LUMBAR DISC HERNIATION AMONG SPINE SURGEONS IN THE UNITED STATES BY MROZ ET AL.

Mroz *et al.* analyzed the differences in handling recurrent lumbar disc herniations among spine surgeons in the United States.^[3] They analyzed the responses of 445 surgeons who responded to electronic surveys asking how they managed first and second disc recurrences. Surgeons in practice for more than 15 years were more likely to select simple disc revision, whereas surgeons with fewer years in practice

and those carrying out more than 200 cases per year were more likely to select revision surgery in conjunction with some form of interbody fusion. Additionally, the authors noted “No significant differences were identified for region, specialty, fellowship training, or practice type. Overall, there was 69% and 22% probability that two randomly selected spine surgeons would disagree on the surgical treatment of two- and one-time recurrent disc herniation, respectively”. This study underscores the following points: (1) there are marked differences regarding how US spine surgeons manage primary and secondary recurrent lumbar disc herniations, (2) it is critical to determine the reasons for these different treatment strategies, and (3) it is important to correlate the best treatment with the most cost-effective management strategies.

COMMENTARY ON “PREDICTING SURGICAL SITE INFECTION AFTER SPINE SURGERY: A VALIDATED MODEL USING A PROSPECTIVE SURGICAL REGISTRY BY LEE ET AL.

Utilizing a large prospective surgical registry from two institutions, Lee *et al.* performed a multivariate analysis of more than 1532 patients to validate a predictive model for the risk of surgical site infection after various spine surgeries.^[2] Outcomes were based on an analysis of the frequency of return to the operating room for irrigation/debridement. Patients’ comorbidities were utilized to help predict the risk of infection (e.g. obesity, rheumatoid arthritis, and the number of levels/extent of surgery). Analysis of these risk factors and consultation with the web site SPINESAGE.com, enabled the individual surgeon to better counsel patients on their risks of infection should they undergo spinal surgery.

REFERENCES

1. Haneder S, Ong M, Budjan J, Schmidt R, Konstantin S, Morelli JN, *et al.* ²³Na-MR of the human lumbar vertebral discs: In-vivo measurements at 3.0T in healthy volunteers and patients with low back pain. *Spine J*, 2014; S1529-9430:00108-9.
2. Lee MJ, Cizik AM, Hamilton D, Chapman JR. Predicting Surgical Site Infection after Spine Surgery: A validated model using a prospective surgical registry. *Spine J* 2014; S1529-9430:00061-8.
3. Mroz TE, Lubelski D, Williams SK, O'Rourke C, Obuchowski NA, Wang JC, *et al.* Differences in the Surgical Treatment of Recurrent Lumbar Disc Herniation Among Spine Surgeons in the United States. *Spine J* 2014; S1529-9430: 00114-4.
4. Tsantoulas C, McMahon SB. Opening paths to novel analgesics: The role of potassium channels in chronic pain. *Trends Neurosci.* 2014; S0166-2236: 00231-2.